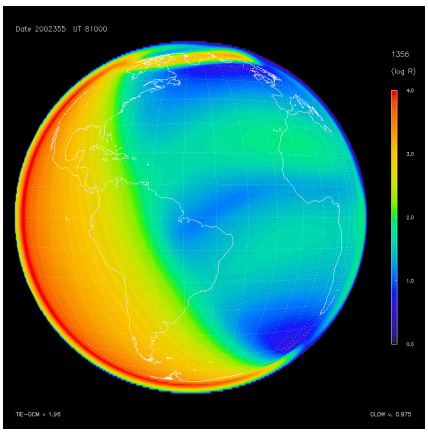
Space Science Seminar
Tuesday, 2016 May 17
10:30 a.m.
NSSTC/2096

A New Perspective on the Thermosphere-Ionosphere System from the Global-scale Observations of the Limb and Disk (GOLD) Mission

By Richard Eastes, GOLD Mission PI
Host: Dr. Jim Spann (sponsored by ZP10)

The GOLD mission will provide unprecedented imaging of the Earth's Thermosphere-Ionosphere (T-I) system and its response to forcing from the Sun and the lower atmosphere. The mission is scheduled to launch a far ultraviolet imaging spectrograph into a geostationary (GEO) orbit in late 2017. From this vantage point it will make, at a thirty-minute cadence, images that cover most of a hemisphere. These images will provide quantitative information about the composition (O/N_2 density ratio) and temperature of the neutral atmosphere in the lower thermosphere on the dayside. At night, the peak electron density and the bubbles that occur within them will be imaged. Combining global scale images of the composition with simultaneous images of the temperature will provide new insights into the behavior of the T-I system and to its response to external forcing from the Sun, geomagnetic activity and the waves and tides originating in the lower atmosphere. Since GOLD can repeatedly observe the same geographic locations it can provide context for measurements from low Earth orbit or from the ground, and it can separate temporal from spatial changes in the T-I system. The GOLD mission's measurements and observing approach give the scientific community a new perspective on the T-I system.



Simulated image of Earth's emission brightness at 135.6 nm, primarily from atomic oxygen, as observed from a geostationary orbit at 47.5 degrees west longitude where the GOLD imager will be stationed. The emissions are computed using the Global Airglow model with neutral and ion densities from the NCAR Thermosphere-Ionosphere-Electrodynamics General Circulation Model (S. C. Solomon, personal communication). These images of the Earth are calculated for 21 December of an arbitrary year at solar maximum, but with low geomagnetic activity. In this image, for 22:30 universal time, emissions from the dayside, nightside and the aurora (northern hemisphere) are visible. Brightness variations across the dayside range from ~10 kR (red) to ~100 R (green). The blue areas shown on the nightside of the Earth correspond to 10 to 100 R.

http://solarscience.msfc.nasa.gov/colloquia/